

# **FIREFIGHTER II MOD B**

## **NOZZLES AND FIRE STREAMS**

## **Firefighter II, Mod B**

### **Nozzles and Fire Streams**

#### **2-13 Nozzles and Fire Streams**

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- 2-13.2** Identify the purposes of a fire stream. (3-3.7)
- 2-13.3** Identify the advantages of using water as an extinguishing agent. (3-3.7)
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  - 2-13.31.1 Open and close a fog nozzle
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  - 2-13.31.3 Adjust the flow setting on an adjustable gallonage fog nozzle
  - 2-13.31.4 Open and close a solid stream nozzle
- 2-13.32 **Demonstrate the use of adapters carried on a pumper as required by Section 3-8 of NFPA1901, Standard for Automotive Fire Apparatus.**
- 2-13.33 **Demonstrate the procedures for inspecting nozzles for damage. (3-3.6(b), 3-3.9(b))**
- 2-13.34 **Demonstrate the procedures for cleaning and maintaining nozzles. (3-3.6(b), 3-3.9(b))**
- 2-13.35 **Demonstrate extinguishing or controlling the following live fires working as a member of a team and using appropriate protective equipment, firefighting tools, and extinguishing agents:**
  - 2-13.35.1 Piles/stacks of Class A combustible materials (exterior)
  - 2-13.35.2 Open pans for combustible liquids (exterior)
  - 2-13.35.3 Vehicle fires
  - 2-13.35.4 Storage containers (exterior dumpster/trash bin)
  - 2-13.35.5 Class A combustible materials within a structure (interior attack)

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**2-13-35.6 A hidden fire within a structure**

**2-13.35.7 Ground cover fire**

**2-13.36 Demonstrate assembling the components of a foam fire stream. (3-3.15)**

**2-13.37 Demonstrate application technique of Class B foam (3-3.15)**

**REFERENCES:**

IFSTA, Essentials, 4<sup>th</sup> ed., Chapters 12-13.

Delmar, Firefighter's Handbook, copyright 2000, Chapters 10-11

Jones & Bartlett, Fundamentals of Fire Fighting Skills, 1<sup>st</sup> ed., Chapters 7, 16, 20, & 21

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**2-13 Nozzles and Fire Streams**

- I. Identify a fire stream. **2-13.1 (3-12.8)**
  - A. Definition: A stream of water, or other extinguishing agent, after it leaves the fire hose and nozzle until it reaches the desired point.
- II. Identify the purposes of a fire stream. **2-13.2 (3-3.7)**
  - A. Applying water or foam directly to burning material to reduce its temperature.
  - B. Applying water or foam over an open fire to reduce the temperature so firefighters can advance hand lines closer to effect extinguishment
  - C. Reducing high atmospheric temperature
  - D. Dispersing hot smoke and fire gases from a heated area by using a fire stream
  - E. Creating a water curtain to protect firefighters and property from heat
  - F. Creating a barrier between a fuel and a fire by covering with a foam blanket
- III. Identify the advantages of using water as an extinguishing agent. **2-13.3 (3-3.7)**
  - A. Greater heat absorbing capacity than other common extinguishing agents
    - 1. One BTU is the amount of heat required to raise the temperature of one pound of water one degree F
    - 2. Cools fuel below ignition temperature
  - B. A relatively large amount of heat is required to vaporize liquid water to steam – 970 BTU's are required to vaporize water, changing it to steam
  - C. The greater the surface area of the water exposed, the more rapidly heat will be absorbed
  - D. Water converted to steam occupies 1700 times the original volume occupied by the liquid
    - 1. Displaces hot gases, smoke and other products of combustion
- IV. Identify the disadvantages of using water as an extinguishing agent. **2-13.4 (3-3.7)**
  - A. Water has a considerable amount of surface tension.
    - 1. Will not readily penetrate certain porous materials

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- B. Will react with certain combustible materials
    - 1. Certain metals
  - C. Freezing will occur at 32<sup>0</sup> F (0<sup>0</sup>C)
  - D. Water has low viscosity; it will not cling or readily coat materials
  - E. May conduct electricity under certain conditions
- V. Identify three (3) major types of fire stream patterns **2-13.5 (3-3.6, 3-3.9)**
- A. Solid Streams
    - 1. Designed to produce a stream as compact as possible with little shower or spray
    - 2. Produced from a fixed orifice
    - 3. Longer reach than other types of streams
    - 4. Reduced problem of steam burns to firefighters and trapped civilians as a result of disturbance to the normal thermal layering of heat and gases during interior structural attack
    - 5. Operating pressures (2-3.9(a))
      - a. 50 psi on handlines
      - b. 80 psi on master stream devices
  - B. Fog Stream
    - 1. A fog stream is a patterned stream composed of fine water droplets
    - 2. Variable stream patterns can be produced
      - a. Wide angle fog
      - b. Narrow angle fog
      - c. Straight stream
    - 3. Greater heat absorption due to more surface area of water exposed
    - 4. May be used in close proximity to energized electrical equipment
    - 5. Have less reach than solid streams
    - 6. Less penetrating power than solid streams
    - 7. Susceptible to wind currents
    - 8. Improper use during interior attacks can
      - a. Spread fire
      - b. Create heat inversion
      - c. Cause steam burns to firefighters and trapped civilians
    - 9. Operate at designed pressure (3-3.6, 3-3.9)

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C. Broken Stream

1. Solid stream broken into coarsely divided water droplets
2. Droplets are larger than fog stream droplets and have better penetration

VI. Identify three (3) sizes of fire streams. **2-13.6** (3-3.6, 3-3.9)

A. Fire streams are identified by size and type.

1. The size is the amount of water, in gallons per minute that will flow at a specified pressure.
2. The type of fire stream is the pattern
  - a. Booster lines
    - 1) Low- volume stream: Discharge is generally less than 40 GPM
    - 2) Handline stream: Generally range from 40 – 350 GPM
      - a)  $\frac{1}{2}$ " to 2" diameter handlines (small): 40-100 GPM
      - b)  $2\frac{1}{2}$ " - 3" diameter handlines (medium/large): 165-350 GPM
    - 3) Master stream: Discharge is greater than 350 GPM

VII. Identify the design of the three (3) major types of fire stream nozzles and tips. **2-13.7** (3-3.6, 3-3.9)

A. Solid stream nozzles

1. Shape of the stream in the nozzle is gradually reduced until it is a short distance from the outlet.
2. Has a smooth finished waterway one (1) to one and one-half ( $1\frac{1}{2}$ ) times it's diameter
3. Discharge orifice should be no greater than one-half the diameter of the hoseline supplying the nozzle

B. Fog stream nozzles

1. Set or constant gallonage nozzles
  - a. One flow rate at a given discharge pressure

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2. Adjustable gallonage nozzles
  - a. Allows one of several preset gallon settings to be selected
3. Automatic nozzles
  - a. Discharge a wide range of flows depending on the pressure being supplied to the nozzle

C. Broken stream nozzles

1. Limited to special applications
2. Designed for a specific use
3. Types
  - a. Water curtain
    - 1) Designed to produce a fan-like pattern that is most effective if sprayed directly upon the exposure being protected.
  - b. Cellar or distributor nozzle
    - 1) Designed to be raised or lowered through holes in floors or ceilings
  - c. Piercing nozzle
    - 1) Designed with a hardened steel tip that can be driven through a wall or partition
    - 2) Can be used on trunk or engine compartment of a vehicle

VIII. Identify the required nozzle pressure of fire stream nozzles. **2-13.8** (3-3.6, 3-3.9)

- |    |                            |         |
|----|----------------------------|---------|
| A. | Smooth bore handline:      | 50 PSI  |
| B. | Fog handline, normal       | 100 PSI |
| C. | Fog handline, mid-pressure | 75 PSI  |
| D. | Fog handline, low pressure | 50 PSI  |
| E. | Smooth bore master stream  | 80 PSI  |
| F. | Fog master stream          | 100 PSI |



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- IX. Identify the major parts of a fog nozzle. **2-13.9 (3-3.7)**
- A. Nozzle control valve
    - 1. Permits regulation of the flow
    - 2. Types
      - a. Ball valve
      - b. Slide valve
      - c. Rotary control
  - B. Exterior barrel
    - 1. Body of nozzle
    - 2. Rotating changes stream pattern
  - C. Deflecting stem
    - 1. Position in relation to barrel determines shape of stream
  - D. Gallonage adjustment ring (on variable gallonage nozzles)
    - 1. Used to select gallons per minute desires
  - E. Rubber bumper/guard
    - 1. Located on barrel of nozzle
      - a. Provides solid grip for adjusting stream pattern
      - b. Protects nozzle if dropped
  - F. Play pipes
    - 1. Tapered pipe used to accelerate flow
    - 2. Usually found on 2½ inch nozzles
  - G. Stream straighteners
    - 1. Used to prevent the twisting motion of a fire stream
  - H. Accessories
    - 1. Pistol grips
    - 2. Large double handles (usually 2½ inch nozzles)

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- X. Identify the water flow through various types of fog nozzles. **2-13.10 (4-3.1)**
- A. Periphery –deflected
    - 1. Produced by deflecting water from the periphery of an inside, circular stem and then again by the exterior barrel
    - 2. Position of exterior barrel determines shape of stream
  - B. Impinging jet
    - 1. Developed by driving several jets of water together at a fixed angle
    - 2. Usually produces wide fog patterns
- XI. Identify the operation of fire stream nozzles. **2-13.11 (3-3.6, 3-3.9)**
- A. Solid stream handline nozzles
    - 1. Attach proper size tip to shutoff
    - 2. Slowly open bail to bleed off air
    - 3. Slowly open and close the nozzle using the bail
  - B. Solid stream master stream nozzles
    - 1. Position device for use
    - 2. Check for proper tip size for volume to be delivered
    - 3. Make sure device is secured using supplied attachment device
    - 4. Have appliance charged
    - 5. Elevate and/or rotate nozzle slowly for maximum reach and penetration
  - C. Fog stream handline nozzle
    - 1. Check to make sure nozzle is set to desired pattern and gallonage (if adjustable)
    - 2. Slowly open bail to bleed off air
    - 3. Slowly open the nozzle using the bail
    - 4. Adjust fog pattern as desired
    - 5. Slowly close the nozzle using the bail
  - D. Fog master stream nozzles
    - 1. Position device for use
    - 2. Check for desired pattern and gallonage (if adjustable)
    - 3. Make sure device is secured using supplied attachment device
    - 4. Have appliance charged

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5. Elevate an/or rotate nozzle slowly for maximum reach and penetration
  6. Adjust fog pattern as desired
- E. Broken stream nozzles
1. Water curtain
    - a. Position device for use
    - b. Secure in place
    - c. Have appliance charged
    - d. Adjust so that it is spraying on exposure to be protected
  2. Cellar or distributor nozzle
    - a. Position nozzle for use
    - b. Have device charged
    - c. Check for proper placement and reach
    - d. Secure or support in place so nozzle rotation does not displace it
  3. Piercing nozzle
    - a. Position nozzle for penetration
    - b. Drive nozzle into position with a striking tool
    - c. Open nozzle slowly
- XII. Identify the nozzle pressure effects and the flow capabilities of fire stream nozzles. **2-13.12 (3-3.9)**
- A. Definition: The force of nature that makes the nozzle move in the opposite direction of the water flow. The nozzle operator must counteract the thrust exerted by the nozzle to maintain control.
- B. Solid stream
1. Flow rate is dependant on the velocity of the stream and size of discharge opening
  2. Increase of size of discharge orifice or velocity will increase flow
  3. Nozzle tip size should not be more than one-half (1/2) the diameter of the hose
  4. The greater the discharge pressure, the greater the reach
  5. Maximum horizontal reach is attained at an angle of 32 degrees
  6. Vertical reach into structures is best at a 70-75 degree angle
  7. Greatest vertical reach is a 90 degree angle
  8. Wind will affect stream shape and reach

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- C. Fog stream
1. Flow rate is dependent on type of nozzle (constant, adjustable gallonage, automatic) pressure and stream pattern
  2. The wider the fog pattern, the shorter the reach
  3. Once maximum reach has been attained, increases in nozzle pressure have little effect on reach and limited increase in volume
  4. Low nozzle pressure reduce velocity, reach, and volume
  5. Factors affecting reach:
    - a. Gravity
    - b. Water velocity
    - c. Pattern of nozzle
    - d. Friction of water against air
    - e. Wind

XIII. Identify nozzle reaction. **2-13.13** (3-3.6, 3-3.9)

- A. Nozzle reaction: Newton's Third Law: For every action, there is an equal and opposite reaction
- B. The greater the nozzle discharge pressure, the greater the nozzle reaction

XIV. Identify water hammer and one method of its prevention. **2-13.14** (3-3.9)

- A. Definition: Sudden stopping of water flow resulting in surge of energy in opposite direction.
- B. Effects: Broken pipes, hoses, pumps, and hydrants
- C. Prevention: Open and close valves slowly
- D. Cause: Rapid/sudden closing of nozzles or valves

XV. Identify three (3) observable results that are obtained when the proper application of a fire stream is accomplished. **2-13.15** (3-3.9)

- A. Fire "darkens" down
- B. Thermal layer is maintained
- C. Visibility is not decreased

XVI. Identify the safe procedures in the handling of fire hose and associated equipment. **2-13.16** (3-3.9)

- A. Watch for over-pressurization
- B. Operate handlines with minimum of two firefighters
- C. Remain aware of fire conditions
- D. Follow personal safety procedures

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XVII. Identify methods of preventing damage to a nozzle and associated equipment. **2-13.17 (3-3.9)**

A. Methods of preventing damage

1. Open nozzles and other appliances slowly
2. Close nozzles and other appliances slowly
3. Avoid dropping nozzles and appliances
4. In cold weather, leave nozzles cracked open to prevent freezing

XVIII. Identify the types of ground cover fires. **2-13.18 (3-3.8)**

A. Types of ground cover fires (classified by fuel)

1. Ground fuels (duff): Small twigs, leaves and needles
2. Surface fuels: Living surface vegetation including grass, brush, and other low vegetation.
3. Aerial fuels: Suspended and upright fuels physically separated from the ground fuels to the extent that air can circulate freely around the fuels causing them to burn more readily.

XIX. Identify the procedures for extinguishing ground cover fires. **2-13.19 (3-3.8)**

A. Perimeter control

1. Control line may be established
  - a. Burning edge of the fire
  - b. Next to the edge of the fire
  - c. At a considerable distance from the fire
2. Attack methods
  - a. Direct action is taken directly against the flames
  - b. Indirect used at varying distances from the fire
3. Ten Standing Orders
  - a. Fight fire aggressively but provide for safety first
  - b. Initiate all action based on current and expected fire behavior
  - c. Recognize current weather conditions and obtain forecasts
  - d. Ensure instructions are given and understood
  - e. Obtain current information of fire status
  - f. Remain in communication with crew members, your supervisor, and adjoining forces

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- g. Determine safety zones and escape routes
- h. Establish lookouts in potentially hazardous situations
- i. Retain control at all times
- j. Stay alert, keep calm, think clearly, act decisively

XX Identify the principles of foam as an extinguishing agent. **2-13.20 (3-3.15)**

A. Components of foam

- 1. Air
- 2. Water
- 3. Concentrate

B. Types of foam concentrate

- 1. Class B
  - a. Protein
  - b. Fluoroprotein
  - c. Film Forming Fluoroprotein
  - d. ATC
- 2. Class A
  - a. Formulation of hydrocarbon surfactants

XXI Identify the equipment necessary for foam application **2-13.21 (3-3.15)**

A. Foam Equipment

- 1. Eductors
  - a. In-line
  - b. By-pass
- 2. Nozzles
  - a. Low expansion
  - b. Medium expansion
  - c. Fog
- 3. Compressed Air Foam Systems (CAFS)
  - a. Used for Class A foams

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#### **B. Foam application**

1. Bank-in or roll on
  - a. Direct foam stream on the ground before fire and roll onto fire
  - b. Continue application until entire surface of fuel is covered and fire is extinguished
  - c. Use only on a pool of liquid fuel on the open ground (spill or fire)
2. Bank-back, bounce-off, bank-down, or deflection
  - a. Foam stream is banked off a wall or other object and rolls down or back onto the spill or fire
  - b. Continue application until entire surface of fuel is covered and fire is extinguished
  - c. Used primarily in dike fires and around damaged or overturned transport vehicles
3. Rain-down or snowflake
  - a. Foam is sprayed high in the air and floats down onto spill or fire
  - b. Continue application until entire surface of fuel is covered and fire is extinguished
  - c. Used when other two methods are not feasible
  - d. Primary manual application technique for above ground storage tanks

#### **XXII. Identify the following methods of water application 2-13.22** (3-3.7)

##### **A. Direct 2-13.22.1**

1. Apply water directly on burning fuels
  - a. Most efficient use of water
2. Should be applied in short bursts
3. Application of water until the fire "darkens down"

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B. Indirect **2-13.22.2**

1. Fog stream directed at ceiling, into superheated atmosphere results in the production of large quantities of steam
2. Not desirable when victims may yet be present
3. Where spread of fire into uninvolved spaces cannot be contained.

C. Combination **2-13.22.3**

1. A ceiling level attack combined with an attack on burning materials at the floor level
2. Nozzle is rotated with stream edge reaching the ceiling, wall, floor and opposite wall

XXIII. Identify the use of nozzles carried on a pumper as required by Section 3-8 of NFPA 1901, Standard for Automotive Fire Apparatus, 1996 ed. **2-13.23** (3-3.9)

A. Fog **2-13.23.1**

1. Open/close
2. Adjust the stream pattern on a fog nozzle **2-13.23.2**
  - a. Narrow fog to wide fog
3. Adjust the flow setting on an adjustable gallonage fog nozzle **2-13.23.3**

B. Open and close a solid stream nozzle **2-13.23.4**

1. Open
2. Close

XXIV. Identify the use of adapters carried on a pumper as required by Section 3-8 of NFPA1901, Standard for Automotive Fire Apparatus, 1996 ed. **2-13.24** (3-3.9)

A. Double male/female: Attach to proper coupling

B. Reducer

1. Attach to male coupling
2. Attach female coupling to it.



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XXV. Identify the procedures for inspecting nozzles for damage **2-13.25** (3-3.6, 3-3.9)

- A. Check the gasket
- B. Check for external damage
- C. Check for internal damage and debris
- D. Check for ease of operation

XXV. Identify the procedures for cleaning and maintaining nozzles. **2-13.26** (3-3.6, 3-3.9)

- A. If necessary
  - 1. Clean with soap and water using a soft bristle brush
  - 2. Replace the gasket
  - 3. Clean and lubricate any moving parts that stick according to manufacturer's recommendations

**XXVII.** Identify the procedures for extinguishing or controlling the following live fires , working as a member of a team and using appropriate protective equipment, including SCBA, firefighting tools, and extinguishing agents: **2-13.27** (3-3.9)

- A. Piles/stacks of Class A combustible materials (exterior) **2-13.27.1**
  - 1. Assemble attack crew
  - 2. Approach from upwind
  - 3. Extinguish fire starting at base and working up
  - 4. Have additional crew pull piles apart using overhaul techniques
- B. Class B Open pans for combustible liquids (exterior) **2-13.27.2**
  - 1. Approach from upwind
  - 2. Have bottom of stream in contact with surface
  - 3. Apply agent with a sweeping motion
  - 4. When extinguished, back out
  - 5. Reapply agent as necessary
  - 6. Things to avoid
    - a. Standing in pools of fuel
    - b. Plunging stream into liquid
    - c. Using water after the foam has been applied

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- C. Vehicle fires **2-13.27.3**
  - 1. Assemble attack crew
  - 2. If possible, approach from the sides, uphill and upwind
  - 3. Extinguish ground or under vehicle fires first
  - 4. Extinguish remaining vehicle fire, avoiding front and rear of vehicle
  - 5. DO NOT remove SCBA until it has been determined that the levels of toxic gases are safe
  
- D. Storage containers (exterior dumpster/trash bin) **2-13.27.4**
  - 1. Assemble attack crew
  - 2. Select hoseline appropriate for size of container
  - 3. Slowly open container
  - 4. Extinguish the fire
  - 5. Check for extension
  
- E. Class A combustible materials within a structure (interior attack) **2-13.27.5 (3-3.7(b))**
  - 1. Assemble attack team at entrance
  - 2. Bleed nozzle
  - 3. Ventilate as necessary
  - 4. Enter structure observing conditions and staying low
  - 5. Use desired attack method
  - 6. Discharge water only until fire is "darkened"
  - 7. Proceed to base of fire and complete extinguishment
  
- F. Hidden fire within a structure **2-13.27.6 (3-3.18(b))**
  - 1. Indications
  - 2. Overhaul
  - 3. Water application

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XXVIII. Identify assembling a foam stream arrangement given the appropriate equipment. **2-13.28 (3-3.7)**

- A. Select proper foam concentrate
- B. Place concentrate at eductor
- C. Check eductor and nozzle for compatibility
- D. Adjust the eductor metering valve
- E. Attach eductor to supply side of hose
- F. Attach hose and appropriate nozzle to discharge end of eductor
- G. Place eductor suction hose into concentrate
- H. Open nozzle fully

XXIX. Identify the application technique of a Class B foam. **2-13.29 (3-3.15)**

- A. Bank in or roll on method
  - 1. Assure stream is flowing foam prior to applying to flammable liquid
  - 2. Direct stream to the ground near the front edge of the burning material
  - 3. Build pool of foam and push foam into flammable liquid with stream
- B. Bank-back, bounce-off, bank-down or deflection method
  - 1. Assure stream is flowing foam prior to applying to flammable liquid
  - 2. Direct stream to object inside the spill area
  - 3. Apply foam to different objects to assure even pattern dispersement
- C. Rain-down or snowflake method
  - 1. Assure stream is flowing foam prior to applying to flammable liquid
  - 2. Direct stream into the air allowing the foam to float down to the material

XXX. **Demonstrate the following methods of water application 2-13.30 (3-3.7(b))**

- A. Direct **2-13.30.1**
  - 1. Applies water directly on burning fuels

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B. Indirect **2-13.30.2**

1. Fog stream is directed at ceiling, into superheated atmosphere results in the production of large quantities of steam
2. Considers where spread of fire into uninvolved spaces cannot be contained.

C. Combination **2-13.30.3**

1. A ceiling level attack combined with an attack on burning materials at the floor level
2. Nozzle is rotated with stream edge reaching the ceiling, wall, floor and opposite wall

**XXXI. Demonstrate the use of nozzles carried on a pumper as required by Section 3-8 of NFPA 1901, Standard for Automotive Fire Apparatus, 1996 ed. 2-13.30 (3-3.9(b))**

A. Fog **2-13.31.1**

1. Opens/closes
2. Adjusts the stream pattern on a fog nozzle **2-13.31.2**
  - a. Narrow fog to wide fog
3. Adjusts the flow setting on an adjustable gallonage fog nozzle **2-13.31.3**

B. Opens and closes a solid stream nozzle **2-13.31.4**

**XXXII. Demonstrate the use of adapters carried on a pumper as required by Section 3-8 of NFPA1901, Standard for Automotive Fire Apparatus, 1996 ed. 2-13.32 (3-3.9(b))**

- A. Double male/female: Attaches to proper coupling
- B. Reducer
  1. Attaches to male coupling
  2. Attaches female coupling to it.

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**XXXIII. Demonstrate the procedures for inspecting nozzles for damage 2-13.33 (3-3.6(b), 3-3.9(b))**

- A. Checks the gasket
- B. Checks for external damage
- C. Checks for internal damage and debris
- D. Checks for ease of operation

**XXXIV. Demonstrate the procedures for cleaning and maintaining nozzles. 2-13.34 (3-3.6(b), 3-3.9(b))**

- B. If necessary:
  - 1. Cleans with soap and water using a soft bristle brush
  - 2. Replaces the gasket
  - 3. Cleans and lubricates any moving parts that stick according to manufacturer's recommendations

**XXXV. Demonstrate extinguishing or controlling the following live fires , working as a member of a team and using appropriate protective equipment, including SCBA, firefighting tools, and extinguishing agents: 2-13.35 (3-3.9(b))**

- A. Piles/stacks of Class A combustible materials (exterior) **2-13.35.1**
  - 1. Assembles attack crew
  - 2. Approaches from upwind
  - 3. Extinguishes fire starting at base and working up
  - 4. Has additional crew pull piles apart using overhaul techniques
- B. Class B Open pans for combustible liquids (exterior) **2-13.35.2**
  - 1. Approaches from upwind
  - 2. Has bottom of stream in contact with surface
  - 3. Applies agent with a sweeping motion
  - 4. When extinguished, backs out
  - 5. Reapplies agent as necessary
  - 6. Things avoided
    - a. Standing in pools of fuel
    - b. Plunging stream into liquid
    - c. Using water after the foam has been applied

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- C. Vehicle fires **2-13.35.3**
1. Assembles attack crew
  2. If possible, approaches from the sides, uphill and upwind
  3. Extinguishes ground or under vehicle fires first
  4. Extinguishes remaining vehicle fire, avoiding front and rear of vehicle
  5. DOES NOT remove SCBA until it has been determined that the levels of toxic gases are safe
- D. Storage containers (exterior dumpster/trash bin) **2-13.35.4**
1. Assembles attack crew
  2. Selects hoseline appropriate for size of container
  3. Slowly opens container
  4. Extinguishes the fire
  5. Checks for extension
- E. Class A combustible materials within a structure (interior attack) **2-13.35.5 (3-3.7(b))**
1. Assembles attack team at entrance
  2. Bleeds nozzle
  3. Ventilates as necessary
  4. Enters structure observing conditions and staying low
  5. Uses desired attack method
  6. Discharges water only until fire is "darkened"
  7. Proceeds to base of fire and completes extinguishment
- F. Hidden fire within a structure **2-13.35.6 (3-3.18(b))**
1. Observes indications
  2. Performs overhaul
  3. Applies appropriate water application
- G. Ground cover fire **2-13.35.7 (3-3.18(b))**
1. Direct
  2. Indirect

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**XXXVI. Demonstrate how to assemble a foam stream arrangement given the appropriate equipment. 2-13.36 (3-3.7(b))**

2. Selects proper foam concentrate
3. Places concentrate at eductor
3. Checks eductor and nozzle for compatibility
4. Adjusts the eductor metering valve
5. Attaches eductor to supply side of hose
6. Attaches hose and appropriate nozzle to discharge end of eductor
7. Places eductor suction hose into concentrate
8. Opens nozzle fully

**XXXVII. Demonstrate the application technique of a Class B foam. 2-13.37 (3-3.15(b))**

1. Bank in or roll on method
  - a. Assures stream is flowing foam prior to applying to flammable liquid
  - b. Directs stream to the ground near the front edge of the burning material
  - c. Builds pool of foam and push foam into flammable liquid with stream
2. Bank-back, bounce-off, bank-down or deflection method
  - a. Assures stream is flowing foam prior to applying to flammable liquid
  - b. Directs stream to object inside the spill area
  - c. Applies foam to different objects to assure even pattern dispersement
3. Rain-down or snowflake method
  - a. Assures stream is flowing foam prior to applying to flammable liquid
  - b. Directs stream into the air allowing the foam to float down to the material